PREPRODUCTION INITIATIVE - NELP
SUPER FLIGHT LINE ELECTRICAL DISTRIBUTION SYSTEM (SFLEDS) TEST PLAN

SITE: NAS NORTH ISLAND

1.0 OBJECTIVE

This test plan describes the procedure for gathering performance and environmental data on the super flight line electrical distribution system (SFLEDS). The data will be used to determine the system's efficiency, effectiveness, overall performance, and ability to interface successfully with site operations. It will also be used to quantify environmental benefits such as air emissions and hazardous waste reduction.

2.0 BACKGROUND

The concept of an all-electrical ground distribution system was created to reduce emissions created by engine-driven support equipment (SE). Replacing the diesel-powered mobile electric power plant (MEPP) with conditioned host facility electrical power will not only eliminate diesel emissions but also reduce hazardous materials (i.e., engine oil, fuels, etc.) usage and hazardous waste generation.

Aircraft servicing and maintenance will be accomplished by converting the 60-Hz facility power to the required 400-Hz aircraft power. This will replace the combustion engine-driven MEPP, which normally is used to service and maintain aircraft. Frequency conversion and special line conditioning will be performed at each aircraft distribution point on the flight line.

Sufficient power can be provided to maintain and service aircraft—as well as operate the required SE—by tapping into the host facility power grid and redistributing this source of electricity along the flight line. Various models of existing SE use electric motors in lieu of combustion engines as their prime movers, e.g., the electric-powered version of the portable hydraulic power supply can replace the diesel-powered version. This will enable the end user to plug SE into the SFLEDS distribution point rather than running an internal combustion engine to perform the same task. In addition, few or no modifications to existing SE will be necessary.

3.0 TEST PLAN

3.1 Approach

Testing will be conducted for three months. Quantitative and qualitative data will be acquired through the completion of Tables 1 and 2.

For the purposes of this test plan, it is assumed that each time the 400-Hz cable is used to service and maintain an aircraft, it is replacing the use of a combustion engine-driven MEPP.

Data will be collected on two different data sheets each time the equipment is operated:

- The first will collect information about the electrical SE that is being powered by the SFLEDS. This will be either the mobile air conditioner (A/M32C-21) or the portable hydraulic power supply (A/M27T-7). The data ultimately will be compared to baseline data for the two diesel engine SE counterparts (A/M32C-17 and A/M27T-5), and the results will be published in the final report.

- The second will collect maintenance information and miscellaneous comments concerning the SFLEDS as a whole. All reported concerns, suggestions, or comments will be addressed in a timely manner and documented in the final report.

An hour meter inside the front panel of each frequency converter will be read only by authorized personnel at the request of NAWC Lakehurst. No unauthorized personnel will lower or remove the front panel of any frequency converter at any time. The low meter reading will be used to determine the total hours that aircraft have been plugged directly into SFLEDS. This equates to the number of hours that MEPPs would have been used to power aircraft.

3.2 Test Procedures

The following procedures specify how data are to be collected.

3.2.1 Instructions for Completing Table 1

- **SE Type**
  - **A/M27T-7:** Check this box if the portable hydraulic power supply was used.
  - **A/M32C-21:** Check this box if the mobile air conditioner was used.
- **Date:** Indicate the dates that the unit was used.
- **SE Unit Number:** Indicate the unit number of the SE that was used.
- **Run Time**
  - **Start:** Indicate the time when the unit was turned on.
  - **Finish:** Indicate the time when the unit was turned off.
- **Total Run Time:** Indicate the total time the unit was used. This should equal the difference between the start time and the finish time. If it does not, provide an explanation in the “Comments” section.

- **Engine Service**
  - **Oil:** Indicate whether any oil was added or changed and how much.
  - **Coolant:** Indicate whether any coolant was added or changed and how much.
  - **Miscellaneous:** Indicate whether any other engine servicing was performed and the nature of the servicing. Use the "Comments" section, if needed.
- **Name and Pay Grade of Operator:** Indicate the name and pay grade of the equipment operator.
- **Comments:** Indicate any miscellaneous comments concerning the operation of the electric-driven SE used.

3.2.2 Instructions for Completing Table 2

Whenever the system alarm sounds or any other problem is encountered, this sheet must be filled out. At least one sheet should be filled out each week to record general comments concerning the system.

- **Fault Indication Display Panel:** Whenever the system alarm sounds, indicate which indicator lights are on by checking the appropriate box(es) on the data sheet. If the unit was powered down before the indicators could be read, press the Lite Status button (while the unit is still powered down) to recall which indicators were lit. Also, in the "Comments" section, describe the steps taken to correct the problem.
- **Comments:** Indicate any miscellaneous comments concerning the operation of the SFLEDS equipment.

4.0 REPORTING TEST DATA

The data entry forms are a concise method of data collection. Forms should be completed daily. Data will be collected for at least three months. During this time, weekly status reports (data sheets) will be submitted to NAWCADLKE. Please fax completed forms to . Weekly submissions should be faxed every Monday morning.

Any questions regarding this test report or the data sheets should be addressed to the following POCs: . The final report will include detailed results and observations, assess the system's efficiency and cost effectiveness, and evaluate its ability to interface with site operations.

TABLE 1

SE Type: ☐ **A/M27T-7** (portable hydraulic power supply)
☐ **A/M32C-21** (mobile air conditioner)

Date (d/m/y)	SE Unit Number	Run Time (use 24-hour clock)		Total Run Time (hours:minutes)	Engine Service			Name and Pay Grade of Operator
		Start	Finish		Oil	Coolant	Misc.	

Comments _____
_____
_____
_____
_____
_____
_____

TABLE 2

Date: _____

FAULT INDICATION DISPLAY PANEL

☐ SYSTEM ALARM	☐ BATTERY STATUS
EXTERNAL	
☐ INPUT UNDERVOLTAGE	☐ OUTPUT OVERLOAD
☐ INPUT OVERVOLTAGE	☐ OUTPUT SHORT CIRCUIT
INTERNAL	
☐ OUTPUT UNDERVOLTAGE	☐ BLOWN FUSE
☐ OUTPUT OVERVOLTAGE	☐ FREQUENCY DEVIATION
☐ LOGIC POWER SUPPLY UNDERVOLTAGE	☐ INVERTER OVERTEMPERATURE
☐ LOGIC POWER SUPPLY OVERVOLTAGE	☐ INVERTER ON/OFF RATE
☐ DC LINK UNDERVOLTAGE	☐ PULSE-BY-PULSE OVERLOAD
☐ DC LINK LINE OVERVOLTAGE	

Comments: _____